Zara Canbary and Charles Grant

The Marginal Propensity to Consume for Different Socio-economic Groups

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[*]zara.canbary(at)brunel.ac.uk

[†]charles.grant(at)brunel.ac.uk

Abstract

This paper investigates the marginal propensity to consume for the UK households across different socio-economic groups. It uses the Family Expenditure Survey, a repeated cross section of British Households, which reports expenditure, income, and household characteristics from quarter 1 of 1986 to quarter 1 of 2016. Since each household is interviewed only once we construct pseudo-panels based on the socio-economic status of the household head. We find that households with higher socio-economic status have lower marginal propensity to consume. We also find that the marginal propensity to consume increased after the 2007-2009 financial crisis. This study supports the hypothesis that credit constraints are more serious for lower income groups.

1   Introduction

Estimates of the marginal propensity to consume from changes in income have usually found that households are more sensitive to changes in income than is predicted by the Permanent Income Hypothesis. Hall (1978), for example, argued that 20 percent of households are "rule-of-thumb" consumers and spend a fixed proportion of their current income. A common explanation for this excess sensitivity to changes in current income is that some households are liquidity constrained (Flavin 1984). Such households are unable to smooth consumption since they are unable to borrow in periods where their income is below the desired level of consumption implied by the Permanent Income Hypothesis. A key problem is to identify households likely to be credit constrained. Hayashi (1985), for example, argues households with low levels of savings are constrained, while Zeldes (1989) argues households with low assets-to-income ratios are constrained. They both find their constrained households are more sensitive to income changes and that around 15-20 percent of households do not follow the Permanent Income Hypothesis.

In this paper, rather than use the level of savings or assets as a proxy for credit constraints, we will argue that there are differences in access to credit across socio-economic groups. Professional households are not only likely to have higher and more stable income than low-skilled households, but they are also more likely to have access to credit. This paper will use British household data for 1986-2016 to estimate the marginal propensity to consume and compare the response to anticipated income

changes for four different socio-economic groups. The key contribution of the paper is that it is the first paper that compares the marginal propensity to consume of different types of British household. It will examine how the four socio-economic groups differ and whether these differences are consistent with the hypothesis that lower socio-economic groups are more likely to be liquidity constrained, and hence more sensitive to changes in their income.

An important advantage of our data-set is that it includes the period before, during and after the 2007-2009 financial crisis; the period associated with major changes in borrowing criteria which restricted access to credit markets, (See: Bank of England Financial Stability Report, Sep 2008). This enables us to study the effect of the financial crisis on household expenditure. In this paper we will explore how the marginal propensity to consume of the four different socio-economic groups differ before and after the financial crisis. Our hypothesis is that the crisis affected lower socio-economic groups more severely than those households in higher socio-economic groups.

The paper proceeds as follows: Section 2 discusses the existing literature on the Permanent Income Hypothesis in more detail. Section 3 gives a detailed description of household data which is used in this study. Section 4 describes the empirical methodology while section 5 reports the results. The conclusions are described in section 6.

2 Literature Review

A large literature has been published on the marginal propensity to consume with many showing how household consumption responds to changes in economic resources. The Permanent Income Hypothesis, as outlined by Milton Friedman (1957), suggests only permanent and unexpected income shocks result in a major revision in consumption. This theory suggests that people use borrowing and saving to smooth income fluctuations and they should not respond to changes in income that are fully anticipated. Therefore, an estimation of the marginal propensity to consume out of anticipated income changes should yield insignificant results. For example, an anticipated promotion at work, that can result in change in income level, should not affect the marginal propensity to consume at the time it happens since the expectation of the income change is already included in the information set. Instinctively, when lagged consumption and income are included as instruments in regression a consumption decision is made based on information available at time $t-1$. Hence, the marginal propensity to consume out of predictable changes in income on the basis of past information should be statistically insignificant.

The theory also suggests that rational agents' desired consumption is determined by permanent income, while they have access to credit market; suggesting that when households face a temporary reduction in income to continue consuming as before they need to have access to debt to finance this consumption. This is important because, for example, if a group of households are excluded from the credit market, they are

likely to react strongly to anticipated changes in income.

The permanent income hypothesis has been tested and rejected over time with liquidity constraints as one of the main reason for rejecting the hypothesis. Hall et al. (1978) demonstrates that given the inclusion of lagged consumption, no other variable observed in earlier periods should have any explanatory power for current consumption. He finds households respond differently to different sources of income variations and concludes that aggregate consumption should be modelled for optimal choice of a single, fully rational, and forward looking agent ie. Euler equation approach. Hall (1978) rejects the implications of the pure life cycle-permanent income; arguing households display "excess sensitivity" to predictable changes in income. His results suggest 80 percent of households follow the permanent income hypothesis, but that 20 percent of households are "rule-of-thumb" consumers who consume a fixed proportion of their current income. Hall (1978) does not mention the reason for rejection of hypothesis.

Similarly Flavin (1985) tests the Permanent Income Hypothesis using US Annual Aggregate data and shows marginal propensity to consume to be different from zero and reports excess sensitivity for the proportion of the population subject to liquidity constraints. This could not be attributed to myopic behavior of the individual since the inclusion of unemployment rate as the proxy for liquidity constraint changes the marginal propensity to consume both in magnitude and significance. Without the liquidity constraint proxy, she finds the marginal propensity to consume to be 0.37. After inclusion of the unemployment rate as part of the information set, the marginal

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propensity to consume falls to 0.15; significantly different from the initial estimate. She states that a lack of access to credit market and the myopic behavior of individuals are the main reasons. Both these papers reject the version of the Permanent Income Hypothesis with perfect capital markets. In both papers, predictable changes in income are shown to affect changes in current consumption.

Hayashi (1985) also argues Permanent Income Hypothesis applies to about 85% of the population and income changes explains only a small fraction of the movement in expenditure. He also shows households with high levels of savings are associated with lower excess sensitivity. Later, Altonji and Siow (1987) using PSID data finds including the coefficient of lagged income growth, that the marginal propensity to consume out of predicted changes in income is statistically significant. Zeldes (1989) households' asset to income ratio as measurement of liquidity constraints to confirm the excess sensitivity. He concludes that households with higher asset to income ratio were consistently less sensitive to income changes. Poterba (1988), Wilcox (1989), and Campbell and Mankiw (1989) present analysis of reactions to predictable changes in income using aggregate data. They show that periods in which consumption is high relative to income are typically followed by rapid growth in income. They find a significant marginal propensity to consume of between 0.32 and 0.71. Their findings suggest that while most most households seem to follow the simple rule-of-thumb model of consumption, for a fraction of forward-looking households, their knowledge of future income growth is reflected in current consumption and hence they follow the Permanent Income Hypothesis.

The relationship between liquidity constraint and consumption, in the light of permanent income hypothesis, has received considerable attention from economists. It is worthwhile to look at some studies that consider evidence from individual households expenditure surveys. Runkle (1991) considered home-ownership status as measure of ease of access to borrowing. He assumes that home-owners are less constrained and show less excess sensitivity. He directly tests for liquidity constraints using panel data on individual households and finds no evidence of liquidity constraints. He suggests that the failure of the permanent-income hypothesis is due to aggregation bias. Jappelli et al (1998), exploited the Survey of Consumer Finance to estimate the probability of a household being constrained. They studied food consumption changes in response to anticipated income changes from Panel Study of Income Dynamics and found no evidence for much excess sensitivity associated with the possibility of constraints. Later, Jappelli et al. (2010) established the probability a household was denied access to credit and refused Permanent Income Hypothesis for households with lower probability of access to credit.

Shapiro and Slemrod (1995) interviewing households after announcement of tax reduction concluded that 40% of people interviewed planned to spend the extra cash. Taking the predictable nature of this transitory income increase, Souleles (2002) exploited the anticipated income increase induced by pre-announced tax refunds to test the Permanent Income Hypothesis. Given the predictable nature of this changes in income, it should thus not alter consumption in the year of its receipt, he finds that consumption is excessively sensitive to anticipated tax-cuts with a marginal propen-

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sity to consume of 35% to 60%. In a similar paper, Parker (1999), using the CEX, studied the reaction of household consumption to predictable changes in social security taxes using the security payroll cap, a predictable income decrease in January and increase in the middle of the year. The results show 20 cents increase in non-durable consumption for each dollar increase in this anticipated income. He also rejected the possibility of households being liquidity constrained since the sample only included high-income taxpayers. Similarly, Shapiro and Slemrod (2009) used 2008's tax rebate as a case of predictable income increase and showed that this mostly led to an increase in expenditure for 20% of survey respondents.

There are few studies that support the excess sensitivity for the households. For example, Browning and Collado (2001) is using ECPF Spanish panel data and institutionalized June and December extra wage payments to full-time workers as a case of anticipated income increase and finds no evidence of excess sensitivity suggesting bounded rationality as a reason why earlier researchers found large response of expenditure to predicted income changes. Hsieh (2003) used both annual payments from the state of Alaska's Permanent Fund and tax rebates as cases of predictable income increase and only finds evidence for excess sensitivity with respect to tax refunds but not with respect to payments from the state of Alaska's Permanent Fund.

The literature we have reviewed has largely rejected the Permanent Income Hypothesis since changes in consumption are excessively sensitive to predictable changes in income. One major criticism of this literature is that many of papers are using national aggregate data. Attanasio and Weber (1993) argue that such data is subject to

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aggregation biases, and more importantly conceals the heterogeneity in consumption behaviour across different types of household. They advocate using household survey data where the income changes are traced for each family over time. Using such data allows us to capture the consumption behaviour of households with different household characteristics. However, there are limited number of household panel data sets available with relatively small sample size that often experience attrition and non-response. Hence, most existing studies have been conducted on using US data. The data used in our study is not a true panel. Instead, following Browning, Deaton and Irish (1985) and Attanasio and Weber (1993), we construct a Pseudo-panel. We group individuals who share the same socio-economic status into cohorts, and use the averages within these cohorts as observations in our pseudo panel.

A further criticism of this literature is the nature of proxy for the credit constraint. For example, McCarthy (1995) and Jappelli used level of wealth, Pistaferri (2012) cash-on-hand, Zeldes (1989) used asset to income ratio, and Runkle (1991) used home-ownership to classify the households as constrained or unconstrained. These commonly used factors suggest a very narrow view of credit market conditions.

A number of papers have explored how consumption changed during the 2007-2009 financial crisis. For example, Jensen et al (2017) using Danish household data show banks that reduced their lending caused a significant decrease in the borrowing and spending of their customers. They also find that borrowing remained lower after the crisis and spending foregone during the crisis has not recovered. Dutt et al (2009), using US data, find similar evidence when businesses are unable to borrow during and

after the financial crisis. However, to the best of our knowledge, there is no paper which investigate the changes in behavior of UK households; and in particular how the marginal propensity to consume of households changed as a result of the crisis.

The aim is to see if the estimate of the marginal propensity to consume out of predictable changes in income varies across different socio-economic groups and if so, to see how they are affected, in both magnitude and statistical significance, during and after the financial crisis.

3   Data

This paper uses UK household data on consumption and income from 1986 Q 1 to 2016 Q 1. The Family Expenditure Survey (FES), compiled by the Office for National Statistics, has detailed information on the income and spending of a large number of individual households, covering mainland Britain and Northern Ireland, but excluding students in residential halls, the armed forces, people living in nursing and residential homes, prisoners and the homeless. As well as detailed responses to questions on income and expenditure, the survey also reports details on household characteristics such as age, household size, household composition, and socio-economic status. However, it does not include any information on households' level of education. Each wave of the FES reports the responses of around 6000 households. Households are interviewed on a continuous basis throughout the year, although each household is only interviewed once (meaning the survey is not a genuine panel).

The FES was discontinued in 1994. Between 1995 and 2002 it was replaced by the Expenditure and Food Survey (EFS). Although it categorized the expenditure variables in a slightly different way, the main change is that the survey replaced paper questionnaires with directly digitally recorded responses. It is nevertheless comparable with the earlier FES survey. This survey was renamed the Living Costs and Food Survey (LCF) in 2002 when changes were made to make it comparable to other household surveys in the rest of the European Union. This last change resulted in the some slight changes in the individual expenditure categories.

The use of FES is prompted by Attanasio and Weber (1995). They encourage the use of micro household data rather than the aggregate data commonly used in the study of household consumption and argue that the individuality of agents are better preserved in Survey data, hence, more useful when studying households' behaviour. Additionally, we combine data from the FES, the EFS and the LCF surveys. Thus it will use data from 1986 to the first quarter of 2016. The data was combined using the 2001 consumption categories contained in the Living Cost and Food Survey (known as Classification of Individual Consumption by Purpose, COICOP). This allows us to construct a harmonized overall measure of total and non-durable consumption for each household that is constructed consistently between the surveys. Combining the surveys using identical definitions of the consumption categories enables us to have thirty years of data, a considerably longer period than each individual survey covers.

The questions on income are the same across all three surveys. There are separate questions on wages, second jobs, self-employed income, non-wage income and social

transfers (e.g. benefits). The key question we exploit in our analysis is the question 'what is the normal weekly disposable income of the household?'. This formulation of the question has some advantages. While it is not necessarily the household's income in any particular week, it will be a measure of the household's normal (or expected) level of income, and thus, we claim, a good proxy for the households' permanent income. It is changes in permanent income (or normal income) which should cause changes in the level of consumption of the household (according to the Permanent Income Hypothesis), rather than unpredictable and temporary changes in current income.

The survey data used in this paper is compared to the National Account data in figure 1. The figure shows the average level of overall consumption in the three household surveys (using the left-hand scale and plotted with a solid line), and average household consumption given by the national account data (using the right-hand scale and plotted with a dashed line).[1] The household survey data uses three different surveys, and the figure shows that there is a break in 1992 when the survey switched from the FES to the EFS, and a further break when the survey switched from the EFS to the LCF. Nevertheless, average household consumption grew steadily through most of the sample period. The data shows there was a small recession in the early 1990s and a small decline in 2007 (the height of the recession which resulted from the sub-prime crisis). The pattern of consumption in the three household surveys is

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[1]Note that the numbers are not completely comparable since the National Account data will include household spending by care-home residents, prisoners, military members, and tourists but excludes holiday spending. It will also include the spending made by unincorporated businesses.

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similar that shown in the national account data. The major difference seems to be the sub-prime recession was longer and deeper in the national account data than in the LCF. Nevertheless, the similarities in the broad trends gives us confidence that the use of the survey data is sensible.

3.1   Constructing Pseudo-Panel

Since households are only interviewed once in the household surveys, we can not construct a true household panel. This problem can be overcome by following the approach suggested in Browning, Deaton and Irish (1985); creating a pseudo-panel with the use of cohorts from repeated cross-sections where we create groups of households with shared characteristics. In this approach, individuals sharing some common characteristic are grouped into cohorts, and the average level of consumption and income within each time period and for each cohort is constructed. Both Deaton (1985) and Attanasio and Weber (1995) used year-of-birth to define the cohorts, while Maki et al (2001) defined cohorts based on the level of education.

The key issue we investigate in our paper is the marginal rate of consumption for different groups. We will define groups which are likely to differ in the extent to which they are liquidity constrained. Kempson and Whyley (1999), looking at US data, argued that employment status and ethnicity were good determinants for whether a household is excluded from borrowing. Demirguc-Kunt and Klapper (2013) found that age and employment status are also good predictors of whether a household has access to credit markets. Unfortunately the households do not report their level

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of education in each of the waves of the survey used in this study. Hence in this study we will define the cohorts based on the socio-economic group of each household. We construct four socio-economic groups, "Professional", "Skilled", "Unskilled", and "Unoccupied"; households with a higher socio-economics status are less likely to be liquidity constrained, and hence socio-economic groups are a good proxy for the level of financial exclusion the household experiences.

While the pseudo-panel is not a true panel, since the same households are not used in both time periods, it nevertheless does have some advantages. The key advantage is that the sample response rate will not change over time, since, unlike a true panel, it will not suffer from attrition. As a result, the results from using a pseudo-panel may well be more reliable.

We then investigate the relationship between expenditure and income. Other important factors determining consumption including real interest rates, household characteristics such as age of the household reference person, number of adults plus number of children to make up the family size are also included in the consumption function as control variables.

Table 1 reports summary statistics of household disposable income and expenditure by socio-economic cohort. Household expenditure in each category of consumption as percentage of disposable income is presented in parentheses for each socio-economic groups. The average weekly disposable income is shown in column 3. It is at the highest for the "Professional" households at £905.00 and the lowest for the "Unoccupied" households at £310.40. Weekly average total expenditure of households follows the

same trend. It is reported in column 4 and it is the highest in value at £696.00 which is about 77% of disposable income for "Professional" households. It decreases to £567.00 for "Skilled" households however, at 92% there is an increase as percentage of disposable income for "Skilled" households compared to the "Professional" households. The average weekly expenditure decreases again for "Unskilled" households to £471.00, however, as the percentage of their disposable income, there is an increase to 97.5% compared to the "Skilled" households. Weekly average total expenditure is the lowest at £314.00 for the "Unoccupied" households. This socio-statistic group has the highest expenditure level as the percentage of their disposable income compared to other groups at 105.7%.

This trend persists for the expenditure on non-durable goods that is reported in column 5 of table 1. Expenditure on non-durable goods and services consists about 54.5% of households total expenditure out of disposable income. It is £489.50, 54.5% of their disposable income, for "Professional" huseholds. There is an increase in spending on non-durable goods and services as percentage of disposable income as the household socio-economic status moves from higher to lower skilled employment. Expenditure on non-durable goods and services is £410.00, 66.5% of disposable income, for "Skilled" households. It is £351.80, 73.50% of disposable income, for "Unskilled" households and It is £237.45, 79.70% of disposable income, for "Unoccupied" households. This table shows that households in higher socio-economic groups consume lower percentage of their disposable income in each category of expenditure compared to those in lower socio-economic groups. This is specially important results, since by design, the

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households available funds after their normal average expenditure on goods and services are deducted, determines the amount of credit entitlement for the households. Therefore, as the percentage of expenditure out of the disposable income increases, the amount of credit a household can access decreases.

3.2   Financial Crisis

We believe that the 2007-2009 recession is likely to have had an important effect on the behavior of households. Access to saving and borrowing is a necessary for households to smooth their consumption. The ability of households to obtain credit was dramatically affected by the policy changes after the financial crisis. The Credit Conditions Survey by Bank of England[2] reports a fall in the availability of secured and unsecured credit to households since mid-September 2008 with a view to further reduction in the coming months, Bank of England (2008). This financial crisis transmitted into real economy in October 2008 when the Bank of England started lowering the interest rate initially, from 5% to 4.5%, and eventually falling to 0.5% in March 2009.

Table 2 shows the time line of events happened between 2007-2009 that resulted in one of the worst global financial crisis in history. The initial warning signs came early in 2007, when three major US mortgage providers folded during the sub-prime

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[2]Credit Conditions Survey is a quarterly survey released by Bank of England in which Lenders are asked about secured and unsecured lending to households, to non-financial corporations, small businesses, and to non-bank financial firms in the past three months and the coming three months. The survey is used by the Bank of England's to assess the latest developments in bank funding and household and corporate credit conditions.

mortgage crisis. The crisis later spread across Europe, including UK, causing volatility in the stock market. The UK government had to bail out faltering banks, including temporary nationalisation of the Northern Rock. The crisis deepened in the summer of 2008 when Lehman Brothers, after being refused a bailout by the US government, announced their bankruptcy. This incident caused panic amongst global bankers, leading to the Great Recession. The stock market crashed shortly afterwards. Banks become reluctant to loan and credit markets continued to tighten. Figure 2 shows how consumer credit fell sharply in 2007-2008. This slow down in credit hits the lowest in 2008.

It was thought that easy lending and mortgage default are a key reason for behind the financial crisis, as well as the changes in interest rate. We have divided the sample into two periods, where the break point is at the end of the third quarter in 2008 as banks increasingly tightened their lending criteria. This follows Blinder (2013) who define the beginning of the credit crunch to be the bankruptcy of Lehman Brothers. This is the point at which the access to credit was harder and limited resulting in a reduction in credit to the household sector. This reduction in credit is likely to have affected the ability of households to smooth consumption; in particular, an ability to borrow during and after the financial crisis is expected to affect the capacity of households to manage temporary income declines.

We explore the effect of the financial crisis on household consumption. The aim is to find out if households' marginal propensity to consume differs before and after the financial crisis to see whether the crisis resulted in a change in the households'

marginal propensity to consume. We also investigate whether this change was larger for households in lower socio-economic groups compared to those in higher socio-economic groups. We expect a relatively low marginal propensity to consume for households in higher socio-economic groups, who are likely to be able to maintain the credit access before and after the financial crisis. In contrast, we expect the marginal propensity to consume for lower socio-economic households, who are more likely to be credit constrained, both have a higher marginal propensity to consume before the crisis, and to increase their marginal propensity to consume after the financial crisis when the borrowing becomes more difficult.

4 Methodology

An aim of this study is to look at the marginal propensity to consume for UK households and investigate if it differs for households in different socio-economic cohorts. Analysing the data with a simple model we propose testing the hypothesis under Permanent Income Hypothesis. Within the permanent income hypothesis, marginal propensity to consume out of anticipated changes in income should be close to zero. If the hypothesis is rejected, consumption displays excess sensitivity.

Similar to much of the previous work on the Permanent Income Hypothesis, we estimated the augmented version of the Euler Equation. We consider four different socio-economic groups and some control variables for household characteristics.

$$\Delta \ln C_{it} = \alpha + \sum_{i=1}^{4} \beta_i \Delta \ln Y_{it} + \gamma r_t + \lambda Z_{it} + \varepsilon_{it} \qquad (1)$$

On the left hand side, we have change in logarithm of the consumption, $\Delta \ln C$ for group i between periods $t-1$ and t.[3] On the right had side, we have the predictors of changes in consumption growth; the measure of predictable income changes, $\Delta \ln Y$, and the real interest rate, r_t and control variables for the household characteristics Z, ε is the error term. The subscript i denotes the socio-economic groups. These cohorts are defined for "socio-economic" status of the households; "Professional", "Skilled", "Unskilled", and "Unoccupied". The regression includes the interest rate r_t and a set of controls for household characteristics, Z. We follow Pistaferri (2001), and include time-varying components such as family size and age.

The equation 1 is estimated for total consumption and consumption of non-durable goods and services. The key variable of interest is β, indicating the marginal propensity to consume out of anticipated changes in income. The implications of the permanent income hypothesis we expect $\beta \cong 0$. This in turn implies that changes in consumption are not predictable, thus delivering the well known martingale consumption result (Hall, 1978). Previous income is certainly one of most important determinants of household consumption and needs to be controlled in order to properly evaluate income change on consumption level. To overcome this problem we use the instrumental variable method of estimation to generate an unbiased estimation of β.

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[3]Following Jensen's inequality, the arithmetic average of logarithm of reported values are calculated for expenditure and income rather than the customary logarithm of the arithmetic average.

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In the first stage anticipated changes in income is regressed on the instruments to obtain coefficients that reflect the amount of variation in income changes attributable to this set of instruments.

The first stage coefficient is used to generate predicted value for income changes. This predicted income contains all the information set held by agents up to time $t-1$ that helps them make expenditure decisions. This predicted value of income changes is used to obtain an estimate of the relation of expenditure behaviour and changes in past values of income changes.

For the implementation of the GMM approach, following Blinder and Deaton (1985), Flavin (1981), and Hall (1978), we use as our instrument four lags of income changes. An innovation in this paper is that we also use consumer confidence indicator, lagged once, as an instrument in addition to four lags of income changes. We are using the consumer confidence index constructed by GfK Consumer Confidence Index; a survey designed to capture individuals' attitudes regarding the current and perceived near future economy status, it is affected by economic news, uncertainty, economic growth, and current economic situation amongst many other economic factors. The Consumer Confidence Indicator measures how confident people feel about their income's stability. Hence, it impacts households' economic decisions such as spending activity. As a result, consumer confidence is a key indicator for the overall shape of the economy. The inclusion of lagged Consumer Confidence Index as a forward looking variable is to capture the effect that is not included in economic fundamentals. Individual agents form rational expectations for future income subject to the individuals' information

set at time $t-1$, Ω_{t-1}. Examples of such information could be possibility of promotion at work or financial literacy of the agents that are hard to capture adequately from our data set.

We tested the power and validity of the instruments; four lags of income changes and consumer confidence indicator, lagged once. The values of the F statistics is 35.93. The power of the instruments easily exceeds the conventional minimum standard of power of F = 10. In addition, Hansen's (1982) test for over-identification is consistent with the validity of our instruments. The J-statistic follows a chi-square distribution with 4 degrees of freedom. We fail to reject the null hypothesis that the instruments are valid.

The variables used in equation 1 are expected to capture the variation in the marginal propensity to consume for households in different socio-economic groups.

As well as reporting results for the full sample, we also reports results for two sub-periods; before and after the financial crisis of 2007. This enables us to investigate whether the marginal propensity to consume changed during the financial crisis. We anticipate that the financial condition of household, borrowing and credit access, changed during the financial crisis due to the changes in bank's lending policies. If households access to credit changed then it will affect their marginal propensity to consume after the crisis. Our data includes the Financial Crisis of 2007 during which a change in borrowing criteria and tightening of the financial conditions limited households' credit access significantly.[4] These changes were communicated with the public

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[4]See: Financial Stability Report by the Bank of England, October 2008.

prior to implementation allowing the households to adjust consumption a few quarters before it actually occurs. As explained in section 2, we consider September 2008 as the point of expected tightening of the borrowing conditions. We then evaluate the marginal propensity to consume out of a households expected change sin income before and after the crisis.

5 Results

In this section, we report the results for the marginal propensity to consume for different socio-economic groups. We defined as consumption all expenditure items except mortgage and rent payments. The expenditure values are inflation adjusted to the 2015 price level. The regression equation 1 included income growth instrumented by four lags of changes in income growth and lag of changes in the consumer confidence index and it is augmented by controls for a set of household characteristics including family size, age, and the real interest rate. We established the marginal propensity to consume from predicted changes in income using the full sample, and two sub-samples, before and after the financial crisis of 2007. We ran separate regressions for total expenditure and the expenditure on non-durable goods and services.

Results for the marginal propensity to consume out of the expected changes in income are reported in table 3. Results are shown for the full sample of households in columns 1-2, as well as the sub-samples from before the financial crisis in columns 3-4, and the sub-samples after the financial crisis in columns 5-6. The results suggest

households have different levels of marginal propensity to consume depending on the households' socio-economic status.

Results for the change in total consumption for the full sample is reported in column 1. Results show that the marginal propensity to consume (MPC) out of expected changes in income is not statistically significant for the professional (socio-economic group 1) and the skilled (socio-economic group 2). The MPC is is 0.94 for unskilled households (socio-economic group 3), and statistically significant at 1%. The MPC for unoccupied (socio-economic group 4) is 0.75 and significant at 5%. The results also indicate an increase in the MPC out of expected changes in income for total household consumption as the socio-economic status increases; apart from the unusually high coefficient for the unskilled (socio-economic group 3). The existing literature, (See: Flavin, 1984 and Campbell et al, 1989), reports the MPC between 0.3 and 0.7. While our results for the professional and skilled households (socio-economic groups 1 and 2) at 0.53 and 0.59 are similar to the existing literature, the MPC seems to be much higher for unskilled and unoccupied households at 0.94 and 0.75 respectively.

The second column in table 3 reports the marginal propensity to consume (MPC) of non-durable goods and services out of expected changes in income for households in different socio-economic groups. Results are significant for all four categorise of households with the lowest MPC of 0.47 for the professional Households (socio-economic group 1). With the exception of the skilled households (socio-economic group 2) with MPC of 0.93, MPC gradually increases to 0.65 for unskilled and 0.80 for unoccupied

households. Coefficients are statistically significantly different from each other.

These results indicates that households with different socio-economic firstly alter their expenditure when permanent income changes, secondly the degree at which they alter the expenditure is different in households with different socio-economic groups. These results are consistent with our belief that socio-economic status is a good proxy for households access to credit.

5.1   Financial Crisis

To explore the effect of the financial crisis, we divided our data into two sub-samples; the period up to 2008, and the period after 2008. If the financial crisis reduced the availability of credit to the household sector, then we would expect the marginal propensity to consume from predicted changes in income to increase after the crisis. Moreover, it is likely that the change is not the same for households in different socio-economic groups.

Results for changes in total consumption prior to the financial crisis is reported in column 3, in table 3. The marginal propensity to consume prior to the financial crisis of 2007 follows the same trend and magnitude of those for the full sample. The marginal propensity to consume out of changes in permanent income on non-durable goods and services are reported in column 4. There are insignificant differences between the coefficients for full sample and the sub-sample prior to the financial crisis of 2007. Coefficients are different from each other for household in different categories of households and households in socio-economic group 1 have the lowest marginal

propensity to consume compared to those in higher socio-economic groups. socio -economic level of household is a good proxy for households' access to credit.

Estimates of the marginal propensity to consume for total consumption after the financial crisis is reported in column 5. With the exception of the professional households in socio-economic group 1, the trend of increasing magnitude persists. However, the coefficients are different from those prior to the financial crisis shown in column 3, both in magnitude and statistical significance. It is interesting results for professional households in socio-economic group 1 since the marginal propensity to consume has changed from 0.4 and statistically insignificant prior to the financial crisis to significant at 1% after the financial crisis of 2007. However, the coefficient is not significantly different from 1. The coefficient for households in group 2 and group 3 are not statistically significant. However, surprisingly, the marginal propensity to consume out of predicted changes in income on non-durable goods and services for unskilled households in socio-economic group 3 show significant decrease after the financial crisis. It is 0.54 and not statistically significant after the financial crisis compared to the marginal propensity to consume for the same group of households prior to the financial crisis of 2007 that was 0.93 and significant at 5%.

Marginal propensity to consume(MPC) out of predicted changes in income for non-durable goods and services after the financial crisis of 2007 is reported in Column 6, table 3. With the exception of unskilled households in socio-economic group 3, the marginal propensity to consume for non-durables follows the same trend as the total consumption. The marginal propensity to consume for the the professional households

in socio-economic group 1 has significantly increased to to proximately one after the financial crisis of 2007, same result is indicated for unoccupied households in socio-economic group 4. The results do not show the same increase across the households from higher to lower groups, however, the marginal propensity to consume is statistically different from each other for households in different socio-economic groups.

6   Conclusion

A basic assumption of the permanent income hypothesis is that individuals have free access to the credit market, lending and borrowing at the same rate enabling households to smooth consumption as the current income level changes. According to the permanent income hypothesis predictable changes in permanent income should not alter consumption level; the coefficient, β, should be approximately zero.

Overall results show that for most part professional and skilled households, indicate lower marginal propensity to consume compared to unskilled and unoccupied. While Hall (1978) states around 80% of the households plan their expenditure following the permanent income hypothesis, our results suggest this percentage to be around 50%, when investigating total expenditure. Results for the full sample expenditure on non-durable goods and services also rejects the permanent income hypothesis, indicating the marginal propensity to consume of more than zero and significant for all four socio-economic groups. Our findings are consistent with those of Flavin (1993), who is using unemployment as a proxy for liquidity constraints.

The financial crisis had a significant effect on the households' expenditure behaviour. Prior to the 2007 financial crisis, the results suggest that around half of households were following the permanent income hypothesis. However, the results after financial crisis shows only professional households that is a quarter of households follow the permanent income hypothesis.

Results for the consumption of non-durable goods and services is even more interesting as it indicates the same drop in the percentage of households following the permanent income hypothesis when setting their expenditure level. The marginal propensity to consume for the households in socio-economic groups 1-2 is mostly in line with the permanent income hypothesis. After the crisis, it is unskilled household in socio-economic group 3 that are still following the permanent income hypothesis.

This study aims to contribute to this growing area of research by exploring marginal propensity to consume for different socio-economic groups in the United Kingdom. Initially, we have estimated the marginal propensity to consume using UK Household Expenditure Survey and found evidence that the household expenditure pattern was significantly affected by the anticipated changes in income. These results are consistent with a significant proportion of households being credit constrained.

We have defined four different socio-economic groups, and considered the status as proxy for credit market access: households with higher socio-economic groups are likely to be less liquidity constrained. The Permanent Income Hypothesis was then tested for the four different groups and the response to predictable changes in income rejects the hypothesis for skilled, semi-skilled and unoccupied households. Results support

the idea that professional households, who are least likely to be credit-constrained, are more likely to follow Permanent Income Hypothesis. It also confirms that households with lower socio-economic status have higher marginal propensity to consume. The evidence presented by this paper when using household data adds further support to earlier studies in the rejection of the Permanent Income Hypothesis. Firstly, our findings show that households react to anticipated changes in income by altering their consumption. Secondly, and more interestingly, the marginal propensity to consume out of anticipated changes in income is significantly lower for households in upper socio-economic status. This gradually falls when moving from upper socio- economic groups to lower socio- economic groups.

This alteration in consumption is even more significant during and after a financial crisis, with tightening of credit by banks as one possible explanation. This resulted in an increase in marginal propensity to consume, with the poorer household showing a higher increase in marginal propensity to consume in the aftermath of the financial crisis.

The second finding is of more significant consequences since it confirms that households that are excluded from credit market by design, are unable to smooth consumption when income changes.

References

[1] Aghion, P. and Bolton, P. (1997). A Theory of Trickle-Down Growth and Development. The Review of Economic Studies, 64(2), p.151.

[2] Altonji, J. and Siow, A. (1987). Testing the Response of Consumption to Income Changes with (Noisy) Panel Data. The Quarterly Journal of Economics, 102(2), p.293.

[3] Attanasio, O. and Weber, G. (1995). Is Consumption Growth Consistent with Intertemporal Optimization? Evidence from the Consumer Expenditure Survey. Journal of Political Economy, 103(6), pp.1121-1157.

[4] Banerjee, A. and Newman, A. (1993). Occupational Choice and the Process of Development. Journal of Political Economy, 101(2), pp.274-298.

[5] Blinder, Alan S. and Angus Deaton (1985), "The Time Series Consumption Function Revisited", Brookings Papers on Economic Activity, no. 2, pp. 465-521.

[6] Blundell, R., Pistaferri, L. and Preston, I. (2008). Consumption Inequality and Partial Insurance. American Economic Review, 98(5), pp.1887-1921.

[7] Browning, M. and Collado, M. (2001). The Response of Expenditures to Anticipated Income Changes: Panel Data Estimates. American Economic Review, 91(3), pp.681-692.

[8] Browning, M, and Lusardi, A. Household Saving: Micro Theories and Micro Facts. Journal of Economic Literature 34, no. 4 (1996): 1797-855. http://www.jstor.org/stable/2729595.

[9] Bucks, B. and Pence, K. (2008). Do borrowers know their mortgage terms?. Journal of Urban Economics, 64(2), pp.218-233.

[10] Campbell, J. and Mankiw, N. (1989). Consumption, Income, and Interest Rates: Reinterpreting the Time Series Evidence. NBER Macroeconomics Annual, 4, p.185.

[11] Carbo,S. and Gardener,E. and Molyneux, P. (2007). Financial exclusion in Europe. Public Money and Management, 27 (1) , p. 21

[12] Carroll, C., Slacalek, J., Tokuoka, K. and White, M. (2017). The distribution of wealth and the marginal propensity to consume. Quantitative Economics, 8(3), pp.977-1020.

[13] Deaton, A. (n.d.). Life-cycle models of consumption: is the evidence consistent with the theory?. [S.l.]:[s.n.].

[14] Demirgüç-Kunt, A. and Klapper, L. (2013). Measuring Financial Inclusion: Explaining Variation in Use of Financial Services across and within Countries. Brookings Papers on Economic Activity, 2013(1), pp.279-340.

[15] Devlin, J.F.(2005). A detailed study of financial exclusion in the UK Journal of Consumer Policy, 28 , pp. 75-108

[16] Flavin, M. (1985). Excess Sensitivity of Consumption to Current Income: Liquidity Constraints or Myopia?. The Canadian Journal of Economics, 18(1), p.117.

[17] Flavin, M. (1993). The Excess Smoothness of Consumption: Identification and Interpretation. The Review of Economic Studies, 60(3), p.651.

[18] Friedman, M., 1957. A Theory of the Consumption Function, Princeton NJ: Princeton University Press.

[19] Galor,O. and Zeira, J. (1993) Income Distribution and Macroeconomics, The Review of Economic Studies, Volume 60, Issue 1, Pages 35-52

[20] Hall, R. and Mishkin, F. (1982). The Sensitivity of Consumption to Transitory Income: Estimates from Panel Data on Households. Econometrica, 50(2), p.461.

[21] Hayashi, F. (1985). The Permanent Income Hypothesis and Consumption Durability: Analysis Based on Japanese Panel Data. The Quarterly Journal of Economics, 100(4), p.1083.

[22] J.M. Hogarth, C.E. Anguelov, J. Lee Who has a bank account? Exploring changes over time, 1989-2001 Journal of Family and Economic Issues, 26 (1) (2005), p. 7

[23] Hsieh, C. (2003). Do Consumers React to Anticipated Income Changes? Evidence from the Alaska Permanent Fund. American Economic Review, 93(1), pp.397-405.

[24] Jappelli, T. and Pistaferri, L. (2010). The Consumption Response to Income Changes. SSRN Electronic Journal.

[25] Jensen, T. and Johannesen, N. (2017). The Consumption Effects of the 2007-2008 Financial Crisis: Evidence from Households in Denmark. American Economic Review, 107(11), pp.3386-3414.

[26] Kempson E., Whyley C.(1999). Kept out or opted out? Understanding and combating financial exclusion Policy Press, London

[27] Parker, J. (1999). The Reaction of Household Consumption to Predictable Changes in Social Security Taxes. American Economic Review, 89(4), pp.959-973.

[28] Poterba, James M. "re Consumers Forward Looking? Evidence from Fiscal Experiments." The American Economic Review, vol. 78, no. 2, 1988, pp. 413-418.

[29] Pistaferri, L. (2001). Superior Information, Income Shocks, and the Permanent Income Hypothesis. Review of Economics and Statistics, 83(3), pp.465-476.

[30] Runkle, D. (1991). Liquidity constraints and the permanent-income hypothesis. Journal of Monetary Economics, 27(1), pp.73-98.

[31] Shea, J. (1994). Should we test the Life Cycle: Permanent Income Hypothesis with food consumption data?. Economics Letters, 45(1), pp.63-68.

[32] Shea, J. (1995). Union Contracts and the Life-Cycle/Permanent-Income Hypothesis. The American Economic Review, Vol. 85, No. 1 (Mar., 1995), pp. 186-200.

[33] Stephens, M. (2003). "3rd of tha Month": Do Social Security Recipients Smooth Consumption Between Checks?. American Economic Review, 93(1), pp.406-422.

[34] Shapiro, M. and Slemrod, J. (2009). Did the 2008 Tax Rebates Stimulate Spending?. American Economic Review, 99(2), pp.374-379.

[35] Slemrod, J. and Shapiro, M. (1995). Consumer Response to the Timing of Income. Cambridge, Mass.: National Bureau of Economic Research.

[36] Simpson, W. and Buckland, J. (2009). Examining evidence of financial and credit exclusion in Canada from 1999 to 2005. The Journal of Socio-Economics, 38(6), pp.966-976.

[37] Souleles, N. (1999). The Response of Household Consumption to Income Tax Refunds. American Economic Review, 89(4), pp.947-958.

[38] Yuan, Y. and Xu, L. (2015). Are poor able to access the informal credit market? Evidence from rural households in China. China Economic Review, 33, pp.232-246.

[39] Zeldes, S. (1989). Optimal Consumption with Stochastic Income: Deviations from Certainty Equivalence. The Quarterly Journal of Economics, 104(2), p.275.

Figure 1: Households' Average Total Expenditure in the FES and National Accounts
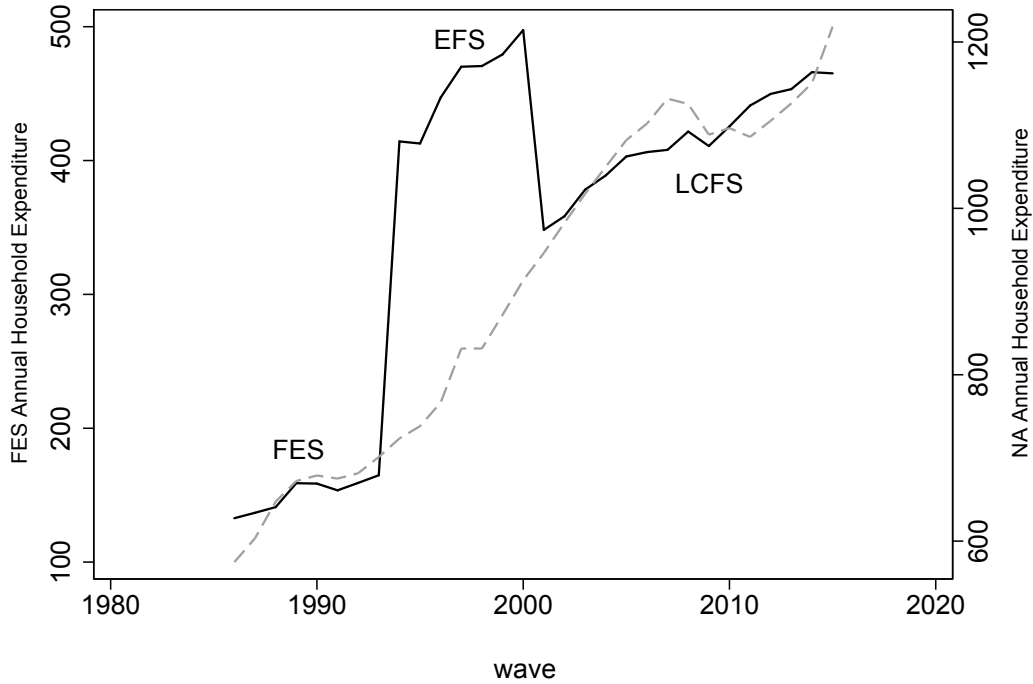
Notes: This figure plots the households' average expenditure in the Household Survey and National Accounts. The continuous black line representing the Household Survey data is our own calculation using UK household expenditure survey data from first quarter 1996 to first quarter 2016 for survey based line. The dashed gray line represents the National Accounts is from ONS for National Accounts data. The left axis is the households' average annual expenditure calculated using the Family Expenditure Survey. The right axis is the households' average annual expenditure from National Account data.

Figure 2: UK Consumer Credit

Notes: Changes of total (excluding the Student Loans Company) sterling gross consumer credit

lending to individuals (in sterling millions) seasonally adjusted. Source: Bank Of England.

Table 1: Summary Statistics, tab:tab1, updated 04/06/19

Socio-economic Group	Observations	Disposable Income	Total Consumption	Non-durables Consumption
Professional	40,107	905.00	696.00	489.50
			(77%)	(54%)
Skilled	34,378	590.00	567.00	410.00
			(96%)	(69%)
Unskilled	37,879	524.50	471.00	351.80
			(90%)	(67%)
Unoccupied	31,218	310.43	314.00	237.45
			(101%)	(76%)

Notes: Source: Own calculation using UK household expenditure survey data from first quarter 1996 to first quarter 2016. All values are in British Pounds. Prices are deflated using the BOE price index for year 2015 to convert nominal prices to current prices. Expenditure as percentage of disposable income in parentheses.

Table 2: Economic and Financial Events 2007-2009

Year	Month	Event	Description
2007	Jan	Sub-prime downgrade (US)	Ownit Mortgage Solutions Inc., American Freedom Mortgage, Inc., Mortgage Lenders Network USA Inc. folded.
	Feb	HSBC warning (US)	The bad debt provisions for 2006 to be 20% higher than expected to roughly \$10.5 bn.
	Mar	Sub-prime collapse	Sub-prime lenders declared bankruptcy, including Accredited Home Lenders Hldg, New Century Fin., DR Horton & Countrywide Fin.
	Aug	UK stock market volatility (UK)	Banks begin to stop lending to each other due to market fears.
	Sep	Northern Rock crisis (UK)	Northern Rock sought emergency funding from the BOE, first run on a bank for more than a century.
2008	Feb	Nationalized Northern Rock (UK)	Struggling Northern Rock is to be nationalized for a temporary period.
	Mar	Bear Stearns Bailout (US)	The firm was bought out by JP Morgan
	Sep	**Lehman Brothers Bankruptcy (US)**	Government protection for Lehman's \$60 bn in uncertain mortgage assets was rejected.
		Nationolized Fortis (EU)	European banking and insurance giant was partly nationalized to ensure its survival.
		Bradford Bingley (UK)	The government takes control its £50 bn of mortgages and loans. Savings operations and branches are sold to Spain's Santander.
		HBOS crisis (UK)	It had to be rescued by Lloyds TSB after a huge drop in its share price.
		Washington Mutual and Wachovia (US)	Two more American banks collapsed.
	36	Irish banking crisis	The first European country to drift into recession, promise from Gov to underwrite the entire Irish banking system, ultimately unable to uphold.
		AIG Nationalized (US)	A bailout of \$150 bn to insure loans and mortgages against default.
		Credit Markets Froze	Banks hoarded cash (\$160 bn) to write-down bad mortgages and withdrawals that led to a cash shortage; resulting in Zero interest rate.
	Oct	Lowering Interest Rate (UK)	The Bank of England cuts interest rate by 0.5% to 4.5% to ease the financial crisis.
		Troubled Asset Relief Program (US)	\$700 Bn Bailout bill was set up to purchase toxic mortgages from banks.
		RBS, TBS, and HBOS Bailout (UK)	The three banks received Government rescue package of £37 bn.
	Nov	End of Investment Banking (US)	Goldman Sachs and Morgan Stanley became regular commercial banks. End of an era of deregulation and high risk.
		Stock Market Crash	Market plummeted due to Congress rejection of \$60 bn the bank bailout bill.
	Dec	More government bailouts (US)	Citigroup and the auto industry also received bailouts.
2009	Jan	Blue Monday Crash (UK)	British banking shares collapsed.
		Bank of America Bailout (US)	Provided with \$20bn from \$700 bn financial rescue fund to help it with the losses incurred when it bought Merrill Lynch.
	Feb	RBS folds (UK)	RBS reports a loss of £24.1bn for 2008, the biggest in British corporate history, made to give up an annual pension worth about £700,000.

Notes: Source: Own calculation. In this table we present a timeline of the key events in the world financial crisis between 2007-2009. The most intense phase of the credit crisis was in September 2008, when the major US investment bank Lehman Brothers filed for bankruptcy.

Table 3: Regression Results

VARIABLES	Full Sample		Year<=2008 Q3		Year>2008 Q3	
	Δc_{it}	Δc_{it}^{nd}	Δc_{it}	Δc_{it}^{nd}	Δc_{it}	Δc_{it}^{nd}
$\Delta \ln Y_{1t}$	0.537	0.466*	0.401	0.348	1.892***	1.454**
	(0.345)	(0.270)	(0.380)	(0.277)	(0.581)	(0.630)
$\Delta \ln Y_{2t}$	0.594	0.975***	0.638	0.952*	0.261	0.762*
	(0.570)	(0.369)	(0.764)	(0.516)	(0.627)	(0.414)
$\Delta \ln Y_{3t}$	0.942***	0.651**	0.931**	0.729**	0.541	0.269
	(0.328)	(0.266)	(0.369)	(0.330)	(0.520)	(0.381)
$\Delta \ln Y_{4t}$	0.757**	0.801***	0.746*	0.705**	0.837**	1.045***
	(0.312)	(0.211)	(0.421)	(0.291)	(0.427)	(0.259)
r_t	0.202	0.0544	0.240	-0.0541	-0.357	-0.283
	(0.177)	(0.124)	(0.352)	(0.206)	(0.604)	(0.472)
se1	0.00494	-0.0305	-0.00178	-0.0446	0.0979	0.0669
	(0.0315)	(0.0231)	(0.0379)	(0.0272)	(0.0648)	(0.0487)
se2	0.00214	-0.0324	-0.00455	-0.0483*	0.0850	0.0606
	(0.0311)	(0.0220)	(0.0386)	(0.0265)	(0.0592)	(0.0427)
se3	-0.0149	-0.0219*	-0.0173	-0.0292**	-0.00784	-0.00551
	(0.0162)	(0.0118)	(0.0207)	(0.0148)	(0.0271)	(0.0209)
Av. Age	-0.0925	-0.135***	-0.119	-0.176***	0.0134	0.00129
	(0.0687)	(0.0503)	(0.0881)	(0.0652)	(0.119)	(0.0806)
Av. Age Sq.	0.0162	0.0212***	0.0203	0.0275***	0.00389	0.00398
	(0.0107)	(0.00785)	(0.0141)	(0.0105)	(0.0182)	(0.0125)
Av. Family Size	0.0258	0.0683**	0.0393	0.0934**	-0.0827	-0.0543
	(0.0420)	(0.0306)	(0.0517)	(0.0374)	(0.0805)	(0.0550)
Observations	424	424	304	304	120	120
Test of overid. res. (P-value)	(0.6)	(0.53)	(0.86)	(0.70)	(0.33)	(0.52)

Notes: In this table results are reported for pooled regression and full sample. The LHS variable is the growth in total consumption Δc_{it} and the growth in non-durable consumption Δc_{it}^{nd}. The variable $\Delta \ln Y_{it}$, $i = 1 - 4$ representing four socio-economic groups, represents the change in logarithm of income at time t. $\Delta \ln Y_t$ is instrumented with four lags of income, and lagged changes in confidence index $dCCI_{t-1}$. se1-se3 are dummy variables for different socio-economic groups. r_t is the BOE real interest rate. Robust standard errors in parentheses. In the table *** means significant at 1 percent, ** means significant at 5 percent, * means significant at 10 percent. Rank Test:$F_{(5, 424)}$=35.